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ABSTRACT

The effectiveness of an administrative technique that sought to persuade students to reapply to college after dropping out for 1 year was tested. A sample of 1,620 students who were eligible for readmission were mailed two different types of letters from the university regarding possible reenrollment. One of these letters emphasized the intellectual benefits of college, while the other appealed broadly to utilitarian reasons for return to school (e.g., success in the real world, credentials). Some of the students received business reply envelopes with their letter; others did not. The control group of 4,176 students were eligible to enroll but were not contacted by the institution. The results support the value of prompting students to reapply. The strongest effect was the letter that emphasized the intellectual benefits of college, rather than vocational possibilities of college attendance. It is suggested that the letter appealing to the intellectual and scholarly benefits of college may have been more effective when a business reply envelope was not included (i.e., the various stimuli in a prompt should not be at cross purposes but should be consistent in the motive to which they appeal). It is proposed that the promptings probably work best when customized to certain student groups. (SW)

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EXPERIMENTAL MODELS AND DECISION MAKING:

MEASURING THE EFFECTIVENESS OF ACTIONS TO INCREASE GENERAL ENROLLMENTS

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Experimental Models and Decision Making:
Measuring the Effectiveness of Actions To Increase General Enrollments

Among the findings in studies of student retention and attrition, there seldom appears a research derived factor that actually can be applied or manipulated by colleges and universities. Studies of enrollment and persistence offer many ambiguities but few factors that can be manipulated to clearly influence attendance.

This paper reports the findings of an experiment that was conducted on the institutional or macrolevel. Specifically, the effectiveness of an administrative action that was taken to persuade students to begin attending again after dropping out of college for a period of time was tested. This study, therefore, may be characterized as applied operational research. As Rossi (1980) has noted, some of the most profound theoretical contributions to the social sciences have come out of applied research. Research that is "applied" is generally conceived to have some immediate utility for practical action and decision making. The immediate utility of this study comes when the results are put into a cost/benefit framework. Since the pay-off (the return to school of a student who otherwise would not have returned) is readily measurable when a control group comparison is made, the benefits of a particular action can be determined.

The nature of complex organizations is to avoid risks (March, 1981). Experiments by their very nature have a problematic outcome. By putting experimental designs in a cost/benefit framework, this tendency to avoid risks can be overcome somewhat because the result may offer immediate,

"applied" knowledge for decision making. An experimental approach, with random assignments to treatment and control groups, can both lessen the cost of programs to promote enrollment and give less ambiguous findings and conclusions. Beyond decision making, however, a purer understanding of psychological and sociological factors that influence the acquisition of learning may be brought out as the factors are explored in the experiment. Consequently, although this research is applied in nature, it has definite theoretical implications for basic concerns about motivations, learning, and attendance patterns.

Previously, at this institution, an experiment was conducted to increase enrollment. Analyses indicated that 28.2% of the test group attended after receiving a stimulus from the institution (e.g., a registration appointment card), while 24% of the control group attended. This difference was shown to be cost effective for the university. The purpose of the experiment reported in this paper was to broadly define, within an experimental context, possible motivational factors that influence attendance.

Review of Research

For some time, studies of enrollment and persistence in institutions of higher learning have sought to determine what factors influence student class attendance. Such studies tend to rely on multivariate statistical models, such as multiple regressions and discriminant analyses, to evaluate the phenomenon (Bean, 1980; Pascarella & Terenzini, 1977; Simpson, Baker & Mellinger, 1980; Terenzini &

Pascarella, 1980). An excellent source of other non-experimental studies is Pascarella's Studying Student Attrition (1982). Pantages & Creedon (1978) also provide a comprehensive review of research studies on attrition. Lenning, Sauer & Beal (1980) provide excellent references to institution-wide experiments on student retention.

Other studies have treated naturally occuring groups from a quasi-experimental design perspective (Anderson, 1981; Newlon & Gathier, 1980). For example, Pedrini & Pedrini (1979) assessed the effectiveness of an experimental program for disadvantaged students in terms of attrition and retention. They found no significant differences between the experimental and control programs and concluded that the experimental program was as effective in keeping disadvantaged students in school as was the control program in retaining regular students.

A longitudinal, quasi-experimental design was used by Pascarella & Terenzini (1981) to investigate the effects of an experimental residence arrangement on college freshmen. They found that the experimental arrangement fostored the development of high quality informal student/faculty relationships which, in turn, had a positive effect on persistence.

A few institution-wide experiments have been reported. Rossman (1967) examined how reducing the teaching load of some faculty in order to give them more time for academic advising affected a group of college freshmen. A slightly higher retention rate was found among women in the experimental group.

McMillan & Kester (1973) conducted experimental design studies

at twenty two community colleges in Northern California. Results included the finding that individual or group counseling of potential dropouts had a positive affect on student retention.

Osborn (1980) conducted a study of two groups of students identified as potential "dysfunctioners." The students in one group received interviews with a psychiatrist or psychologist while those in the other did not. A comparison of the two groups made one year later revealed that students in the experimental group stayed in college longer than did their control group counterparts.

Many of the above studies have a common theme. The theme is that increased personal contact will decrease the tendency to separate from organizations such as colleges and universities. Such studies raise two questions. First, what is the "content" of the personal contact that appears to raise participation? Second, from a practical point of view, what is the minimum stimulus needed to produce a given degree of participation? These questions will be partially addressed in the present study.

Method

Subjects

From a population of over 33,000 students, a sub-population of 5,746 students, who had not attended for one year and who were eligible for readmission, were selected. From this sub-population of 5,746 students, approximately 1,620 students were randomly selected and assigned to the experimental group. The experimental group was further

segmented into four categories. Two of the experimental categories received a letter from the university that appealed broadly to utilitarian reasons for returning to school (e.g., success in the real world, credentials, etc.). The two other factions received a letter that appealed to intellectual reasons for returning to school (e.g., community of scholarship, ideas, etc.). In addition, two of the factions received business reply envelopes with their letter and two did not. The control group consisted of 4,176 students that were eligible to enroll but were not contacted by the institution. Thus, there were five groups: 1) the control group; 2) a group that received a utilitarian letter and no reply envelope; 3) a group that received a utilitarian letter and a reply envelope; 4) a group that received a scholarly letter and no reply envelope; and 5) a group that received a scholarly letter and a reply envelope. All test groups received a reentry application.

Analysis

Analyses consisted of examining the proportions of each of the five groups that either: 1) applied for reentry within two quarters; or, 2) attended within two quarters. Simple chi square tests were done on these proportions. Analyses of variance were performed on the number of credit hours registered for, whether they registered or not, and whether they submitted a reentry form or not.

To fully exploit the experimental data, a multivariate discriminant model was applied to attempt a determination of what academic and personal characteristics are associated with the measured response to the experimental stimuli. The first discriminant analysis used indicators of fields of study, academic performance, and demographic background to ascertain if these factors are associated with responding or not

responding to the experimental stimuli.

Results

The influence of the experiment on prompting former students to reapply is given in Table 1, which shows cross-classifications of control and experimental groups by the students' reentry application status at the end of the second quarter. When the two experimental groups that received no reply envelope were compared to the control group, it was found that 6.1% of the control group applied for reentry compared to 7.7% of the experimental group that received the utilitarian letter. A larger effect was found for the group that received the scholarly letter, 10.6% of which reapplied. Of the groups receiving a reply envelope, 10.0% of the utilitarian group applied compared to 13.2% of the scholarly treatment group. It is noted that the X2 for the distribution in the treatment groups that received reply envelopes has a probability factor associated with it of .20. When the inclusion of an envelope is ignored, and the scholarly and utilitarian groups are compared with the control group, it is found that 11.9% of the scholarly group applied and 8.9% of the utilitarian group applied, while 6.1% of the control group did so.

The question of whether students actually attend classes rather than merely applying for reentry is of greater importance to the institution. In Table 2, attendance status is cross-classified by control and experimental groups. It was found that of those who did not receive a reply envelope, 4.8% of the scholarly treatment group attended the first quarter, 3.1% of the utilitarian group attended the first quarter,

Table 1

Cross-Classification of Control and Experimental Groups

By Reentry Application Status for Two Quarters

	Control	Utilitarian Letter	Scholarly Letter	N
Without Reply Envelope				
Did Not Apply Reentry	93.9%	92.3%	89.4%	4656
Applied for Reentry	6.1%	7.7%	10.6%	329
N	4176	413	396	4985
	X2 = 12.84	df = 2	p = .002	
With Reply Envelope				
Did Not Apply Reenrty		90.0%	86.8%	717
Applied for Reentry		10.0%	13.2%	94
N		408	403	811
	X2 = 1.61	df = 1	p = .20	
Total				
Did Not Apply Reentry	93.9%	91.1	88.1	5373
Applied for Reentry	6.1	8.9	11.9	423
N	4176	821	799	5796
	X2 = 36.75	df = 2	p < .001	

Table 2

Cross-Classification of Control and Experimental Groups by Attendance Status

	Control	Utilitarian Letter	Scholarly Letter	N
First Quarter				
Without Reply Envelope				
Did Not Attend	97.5%	96.9%	95.2%	4850
Did Attend	2.5%	3.1%	4.9%	135
N	4176	413	396	4985
	X2 = 7.79	df = 2	p = .02	
With Reply Envelope				
Did Not Attend		97.1%	96.5%	785
Did Attend		2.9%	3.5%	26
N		408	403	811
Total				
Did Not Attend	97.5%	97.0%	95.9%	5635
Did Attend	2.5%	3.0%	4.1%	161
N	4176	821	799	5796
	X2 = 7.13	df = 2	p = .03	
First and/or Second Qtr.				
Without Reply Envelope				
Did Not Attend	95.4%	94.7%	91.2%	4736
Did Attend	4.6%	5.3%	8.8%	249
N	4176	413	396	4985
With Reply Envelope				
Did Not Attend		93.6%	95.0%	765
Did Attend		6.4%	5.0%	46
N		408	403	811
Total				
Did Not Attend	95.4%	94.2%	93.1%	5500
Did Attend	4.5%	5.8%	6.9%	296
N	4176	821	799	5796
	X2 = 8.16	df = 2	p = .02	

while 2.5% of the control group did so. As noted from Table 1, receiving a reply envelope prompted more reentry applications, but as Table 2 shows, it did not prompt additional attendance rates. For the scholarly group who received reply envelopes, 3.5% attended while 2.9% of the utilitarian group who received envelopes attended. The overall effect for the first quarter shows 4.1% of the scholarly group, 3.0% of the utilitarian group group, and 2.5% of the control group attended. The results of the data on two quarters' attendance show that of those who did not receive a reply envelope, 8.8% of the scholarly group, 5.3% of the utilitarian group, and 4.6% of the control group attended. A possible interaction between the effects and reply envelope may be present when 6.4% of the utilitarian group attended versus 5.0% of the scholarly group did so. Just looking at the letter treatment effect, 6.9% of the scholarly and 5.8% of the utilitarian group attended at least one of the two quarters, whereas 4.6% of the control group attended.

To check for main and interaction effects, analyses of variance were performed by credit hours taken, reentry application received, registered first quarter, or registered first or second quarter (Table 3). On credit hours taken for two quarters, the letter effect had the strongest influence, $p = .030$. Neither receiving or not receiving a reply envelope, nor the interaction of the letter and envelope were shown to be statistically significant. For reentry applications received, the analysis showed a strong letter effect ($p = .001$), but the envelope effect was of marginal significance ($p = .060$). The interaction effect had a probability of .924. Looking at registered the first quarter, the

Table 3

Analysis of Variance of Reentry Status, Attendance Status, and Credit Hours Registered for By Control, Experimental, and Interactive Groups for Two Quarters

Source of Variation	Sums of Squares	d.f.	Main Square	F	p
Credit Hours					
Main Effect	55.628	3	18.543	2.77	.040
Letter	47.031	2	23.515	3.51	.030
Envelope	4.433	1	4.433	.66	.416
Letter + Envelope	9.488	1	9.488	1.42	.234
Explained	65.117	4	16.279	2.43	.046
Residual	38787.715	5791	6.698		
Total	38852.832	5795	6.705		
Registered 1 Qtr.					
Main Effect	.216	3	.072	2.67	.046
Letter	.198	2	.099	3.68	.025
Envelope	.023	1	.023	.86	.353
Letter + Envelope	.013	1	.013	.47	.494
Explained	.228	4	.057	2.116	.076
Residual	156.260	5791	.027		
Total	156.489	5795	.027		
Register 1st or 2nd Qtr.					
Main Effect	.473	3	.158	3.26	.021
Letter	.443	2	.221	4.58	.010
Envelope	.077	1	.077	1.60	.206
Letter + Envelope	.245	1	.245	5.070	.024
Explained	.718	4	.180	3.712	.005
Residual	280.044	5791	.048		
Total	280.762	5795	.048		
Reentry Application					
Main Effect	2.724	3	.908	13.51	.001
Letter	.986	2	.493	7.34	.001
Envelope	.237	1	.237	3.53	.060
Letter + Envelope	.001	1	.001	.92	.924
Explained	2.724	4	.681	10.136	.001
Residual	389.118	5791	.067		
Total	391.842	5795	.068		

letter treatment was shown to be significant ($p = .025$). Using registered for the first and/or second quarter as a measure, the letter effect is found to be significant ($p = .010$), but interestingly, the interaction of the letter and envelope also shows a significant effect, with a probability of .024. This interaction effect is where, as noted above, those in the scholarly letter group without reply envelopes were more likely to attend, while those in the utilitarian with reply envelope treatment group are more likely to attend.

Discriminant analyses were run to check for the possibility of predicting what demographic and academic variables might indicate a propensity to respond to treatments. Only the two letter treatments are looked at. As shown in Table 4, the univariate effects show that cumulative grade point average (GPA) is indeed related to response. Those who reentered tended to have higher cumulative GPA's and those who reentered from the treatment groups tend to have higher GPA's than the control group. However, the discriminant analysis shows that the classification results of only 14.0% correctly classified is hardly better than chance. This suggests that the letters may be tapping certain known background characteristics, but only very weakly.

The discriminant analysis of the control and experimental groups who reentered along with other students in school that quarter was done in an attempt to spot possible background characteristics that the treatment might have stimulated (Table 5). The univariate indications show that nonminority females were disproportionately over represented in the utilitarian letter treatment groups, whereas nonminority males

Table 4

Multiple Discriminant Analysis of Control and Experimental Groups by Selected Academic and Demographic Characteristics

	GROUP MEANS							UNIVARIATE F
	Control Group		Utilitarian Group		Scholarly Group		Total	
VARIABLES	Registered	Did not Register	Registered	Did not Register	Registered	Did not Register		
Academic								
GPA	2.77	2.61	3.06	2.65	3.03	2.74	2.64	2.63
Credit Hrs. earned	63.88	57.49	50.68	58.09	65.02	[illegible].45	57.56	.46
Time	2.40	2.49	2.40	2.47	2.45	2.45	2.48	.32
Liberal Arts Grad.	4.85%	4.47%	8.00%	3.14%	3.03%	4.31%	4.28%	.79
Liberal Arts Undergrad.	18.45%	18.05%	8.00%	18.22%	12.12%	17.89%	18.12%	.65
B. A. Grad.	14.56%	13.09%	4.00%	10.55%	12.12%	10.71%	12.41%	1.67
B. A. Undergrad.	19.42%	18.56%	20.00%	17.84%	21.21%	17.36%	18.34%	.21
Ed. Grad.	31.07%	31.21%	44.00%	34.17%	27.27%	34.20%	32.[illegible]%	1.33
Ed. Undergrad.	4.85%	4.10%	8.00%	4.65%	12.12%	5.22%	4.4[illegible]%	1.54
Demographic								
Minority-female	13.59%	11.69%	8.00%	10.80%	15.15%	12.14%	11.87%	.37
Minority-male	6.80%	5.25%	4.00%	5.40%	9.09%	3.39%	5.07%	1.35
Nonminority female	38.84%	46.85%	52.00%	46.99%	33.33%	48.56%	46.[illegible]%	1.25
Nonminority male	35.92%	32.02%	36.00%	31.78%	39.39%	32.90%	32.23%	.38
N	103	4073	25	796	33	766	5796	

	TOTAL STRUCTURE COEFFICIENTS				
VARIABLES	Function 1	Function 2	Function 3	Function 4	Function 5
Academic					
GPA	.65	.19	.002	.29	.10
Credit Hrs. earned	-.04	.31	-.20	.23	-.08
Time	-.18	-.04	.04	-.40	-.11
Liberal Arts Grad.	-.02	.06	.56	.02	.47
Liberal Arts Undergrad.	-.18	-.14	-.30	.43	-.35
B. A. Grad.	-.42	.34	.34	.06	-.17
B. A. Undergrad.	-.06	.19	.06	-.21	.21
Ed. Grad.	.34	-.35	-.24	.23	.40
Ed. Undergrad.	.46	.25	-.10	-.28	-.20
Demographic					
Minority female	.03	.22	.18	.25	-.38
Minority male	-.21	.45	-.33	-.40	.32
Nonminority female	.03	-.59	.18	-.13	.03
Nonminority male	.17	-.23	.06	.14	.06
GROUP CENTROID					
1) Control-registered	.02	.24	-.03	.13	.06
2) Control-not reg.	-.03	.006	.01	-.006	.001
3) Utilitarian-registered	.51	-.08	.12	-.11	.29
4) Utilitarian-not reg.	.02	-.03	-.10	-.001	.005
5) Scholarly-registered	.40	.49	-.05	-.15	-.10
6) Scholarly-not reg.	.12	-.05	.03	.02	-.02
EIGENVALUES	.005	.003	.002	.0006	.000[illegible]
CANONICAL CORRELATIONS	.07	.05	.04	.02	.02

CLASSIFICATION RESULTS

	PREDICTED GROUP (%)						
	Control Group		Utilitarian Group		Scholarly Group		
Actual Group	Registered	Did not Register	Registered	Did not Register	Registered	Did not Register	N
1) Control-registered	27	7	27	15	23	1	103
2) Control-not reg.	20	15	29	13	19	4	4073
3) Utilitarian-registered	4	4	52	0	28	12	25
4) Utilitarian-not reg.	21	12	29	14	19	5	796
5) Scholarly-registered	21	6	30	6	36	0	33
6) Scholarly-not reg.	21	12	31	11	20	5	766
							5796 (Total N)

Percent Correctly Classified = 14%

Table 5

Multiple Discriminant Analysis of Control and Experimental Group Who Attended With Other Students by Selected Academic and Demographic Characteristics

	GROUP MEANS						UNIVARIATE F
VARIABLES	Utilitarian	Scholarly	Control	Other Reentry	Other Students	Total	
Academic							
GPA	2.48	2.04	2.30	2.16	2.06	2.07	2.46
Hrs. earned	23.96	19.33	29.25	44.15	41.10	41.15	5.54
Liberal Arts	16.00%	15.15%	23.30%	26.47%	23.22%	23.37%	2.08
Business	24.00%	36.36%	33.01%	28.06%	39.80%	39.13%	16.51
Education	44.00%	33.33%	31.07%	17.85%	18.03%	18.13%	7.07
Grad. Stud.	68.00%	54.55%	60.19%	24.87%	35.60%	35.22%	24.99
Demographic							
Minority-female	8.00%	12.12%	13.59%	15.99%	10.74%	11.03%	7.73
Minority-male	4.00%	6.06%	6.80%	8.88%	5.34%	5.53%	6.51
Nonminority-female	52.00%	39.39%	39.81%	41.03%	43.20%	43.08%	.87
Nonminority-male	36.00%	42.42%	36.89%	32.68%	36.78%	36.57%	2.05

	TOTAL STRUCTURE COEFFICIENTS			
VARIABLES	Function 1	Function 2	Function 3	Function 4
Academic				
GPA	.14	.25	-.27	-.53
Hrs. earned	.18	-.44	-.34	-.46
Liberal Arts	.18	-.07	-.49	-.04
Business	-.53	-.33	.05	.40
Education	-.06	.61	.25	-.30
Grad. Stud.	-.57	.67	-.25	-.20
Demographic				
Minority-female	.37	.13	-.32	.41
Minority-male	.35	.11	-.23	.29
Nonminority-female	-.10	-.04	.26	-.64
Nonminority-male	-.19	-.004	.18	.29
GROUP CENTROIDS				
1) Utilitarian	-.15	.90	.19	-.24
2) Scholarly	-.13	.64	.24	.19
3) Control	-.15	.61	-.14	.02
4) Other reentry	.41	.03	-.0008	.0004
5) Other students	-.02	-.007	.0002	-.0002
EIGENVALUES	.01	.003	.0002	.0001
CANONICAL CORRELATIONS	.10	.06	.02	.01

CLASSIFICATION RESULTS

	PREDICTED GROUP (%)					
Actual Group	Utilitarian	Scholarly	Control	Other Reentry	Other Students	N
1) Utilitarian	40	8	24	20	8	25
2) Scholarly	27	15	18	24	15	33
3) Control	26	11	27	23	13	103
4) Other reentry	13	6	9	52	19	1126
5) Other students	14	10	15	34	27	19983
						21270 (Total N)

Percent Correctly Classified = 28%

were disproportionately over represented in the scholarly letters treatment group. The utilitarian group had higher GPA's and fewer credit hours earned. The overall classification was 40% correct for the utilitarian group but only 15% correct for the scholarly group.

Discussion and Conclusion

The major concern of this study has been the extent to which an institution can effect attendance by prompting. The results provide strong support that an institution can indeed induce attendance over what it would be without prompting. The treatments were shown to have a statistically significant effect. The strongest effect was the letter which emphasized the intellectual benefits of college rather than vocational possibilities of college attendance. Also, the letter appealing to the intellectual and scholarly benefits of college may well have been more effective when a business reply envelope was not included. This suggests that the various stimuli in a prompt should not be at cross purposes. They should be consistent in the motive to which they appeal.

Of key importance is the question of the cost effectiveness of any program to induce attendance that might be implemented by an institution. It is felt that this study gives strong evidence of the effectiveness of promptings such as those used in the experiment. The promptings probably work best when customized to certain student groups. The determination of these groups will require further research and experiments. For example, the results of this research suggest that female graduate students might best be prompted by emphasizing the credential related aspects of college attendance. Of course, this hypothesis

would need to be carefully researched, using additional treatment possibilities. An additional hypothesis suggested by the present research is that males who are at the beginning of their college career might best be prompted by appeals to the intellectual value of going to college.

While applied research has its limitations and constraints due to the demands for a practical result, there does exist the possibility of tapping into more fundamental concerns about what motivates college attendance and what students hope to learn and gain from their college experience. There is no need to have an artificial dichotomy between basic and applied research concerning the question of college attendance. Effective programs that prompt attendance that are valid from a cost benefit perspective, must necessarily be rooted in sound and basic educational research. One of the best ways to obtain the necessary interest and support for this fundamental research is to look at an applied question such as prompting.

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